Proton Plan
Cost and Schedule Status
June 2005

Eric Prebys

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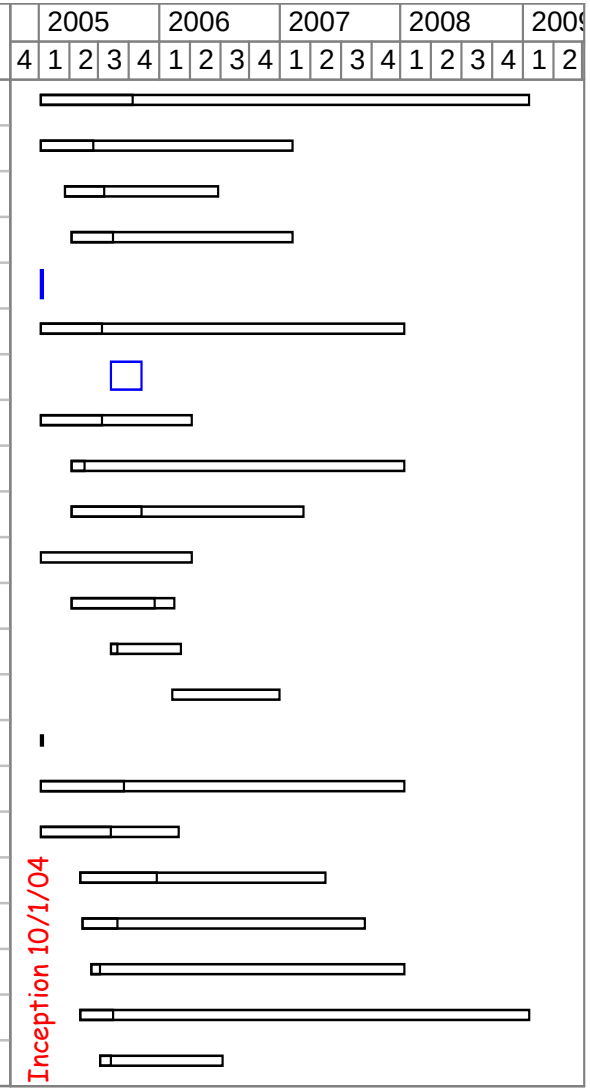
Recent Efforts

- Many changes in the Proton Plan in May and June.
  - The areas that were descoped:
    - Booster Cavity #20
    - Booster Alignment Improvements – Considered maintenance.
  - Revised scope:
    - 1.1.2 - Linac Quad Power Supplies – Will refurbish existing PS instead of replacing PS.
    - 1.2.1 - Booster Determine Rep. Rate Limit was expanded to include reliability studies.
    - 1.3.4.2 - MI RF Upgrade will now consider upgrading only the number of the existing RF Cavities with 2 PA's to get to 6.0 E13.
      - This may free up resources to go to subprojects like Booster RF Upgrade and LLRF
  - New scope:
    - 1.1.4 - Linac LLRF.
    - 1.2.13 - Booster RF Modifications – Scope as a result of reliability studies (1.2.1).
- Booster Corrector's AIP
  - Estimates have increased (total >$5million) as a result of:
    - New power supply vendor qoutes.
    - Revised labor estimates for magnet windings
  - We are currently evaluating two alternative paths to reduce power supply costs that will get us below the $5million AIP cap.

PROTON PLAN ν Schedule - Level 3 Summary

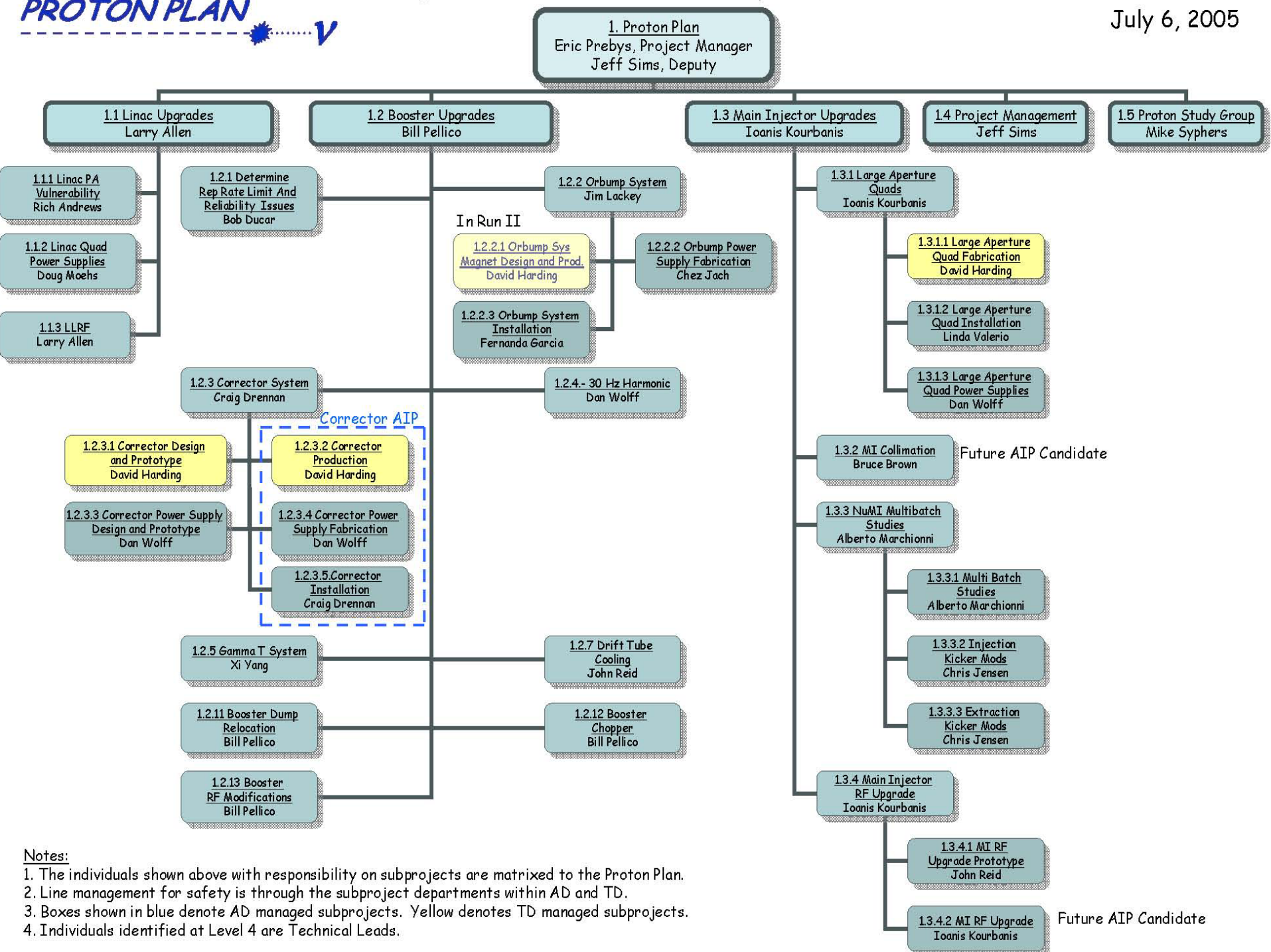
WBS	Name	Start	Finish
1	**Proton Plan**	**Thu 9/30/04**	**Fri 10/17/08**
1.1	**Linac Upgrades**	**Thu 9/30/04**	**Tue 10/31/06**
1.1.1	Linac PA Vulnerability	Wed 12/15/04	Mon 3/20/06
1.1.2	Linac Quad Power Supplies (Revising scope)	Mon 1/3/05	Tue 10/31/06
1.1.3	200 Mhz LLRF Upgrade (Place Holder)	Thu 9/30/04	Thu 9/30/04
1.2	**Booster Upgrades**	**Thu 9/30/04**	**Mon 10/1/07**
1.2.1	Determine Rep Rate Limit & Reliability Issues	Mon 5/2/05	Fri 7/29/05
1.2.2	OrBump System	Thu 9/30/04	Tue 1/3/06
1.2.3	Corrector System	Tue 1/4/05	Mon 10/1/07
1.2.4	30 Hz Harmonic (Project Decision Jan 2006)	Mon 1/3/05	Fri 12/1/06
1.2.5	Gamma-t System (Studies now , may grow)	Thu 9/30/04	Tue 1/3/06
1.2.7	Drift Tube Cooling	Tue 1/4/05	Fri 11/11/05
1.2.11	Booster Dump Relocation	Mon 5/2/05	Thu 12/1/05
1.2.12	Booster Chopper	Mon 10/31/05	Thu 9/21/06
1.2.13	Booster RF Improvements (Place Holder)	Thu 9/30/04	Thu 9/30/04
1.3	**Main Injector Upgrades**	**Thu 9/30/04**	**Fri 10/5/07**
1.3.1	Large Aperture Quads	Thu 9/30/04	Tue 11/22/05
1.3.2	Collimation Systems (MI-8 Collimators Only)	Tue 2/1/05	Tue 2/6/07
1.3.3	NuMI Multibatch Operation (Except Extr. Kicker)	Mon 2/7/05	Tue 6/5/07
1.3.4	Main Injector RF Upgrade (Prototype Only)	Tue 3/1/05	Fri 10/5/07
1.4	**Management**	**Tue 2/1/05**	**Fri 10/17/08**
1.5	**Proton Study Group**	**Fri 4/1/05**	**Fri 3/31/06**



Denotes Fully Scoped Subprojects for Baseline review

PROTON PLAN

July 6, 2005



Notes:

1. The individuals shown above with responsibility on subprojects are matrixed to the Proton Plan.
2. Line management for safety is through the subproject departments within AD and TD.
3. Boxes shown in blue denote AD managed subprojects. Yellow denotes TD managed subprojects.
4. Individuals identified at Level 4 are Technical Leads.

PROTON PLAN

Planned Costs

Initial Budget Guidance = $20,504k

Initial Budget Guidance = $28,680k

WBS	Name	M&S Escalated, K	Cont. %	M&S W/ Cont., K	M&S & SWF Esc.+ Cont, K
1	Proton Plan	$16,280	31%	$21,351	$30,777
1.1	**Linac Upgrades**	**$1,688**	**5%**	**$1,769**	**$2,070**
1.1.1	Linac PA Vulnerability	$1,498	0%	$1,504	$1,673
1.1.2	Linac Quad Power Supplies	$190	40%	$265	$397
1.1.3	LLRF	$0	0%	$0	$150
1.2	**Booster Upgrades**	**$2,452**	**41%**	**$3,462**	**$7,978**
1.2.1	Determine Rep Rate Limit	$0	40%	$0	$171
1.2.2	OrBump System *	$136	40%	$191	$723
1.2.3	Corrector System AIP Candidate FY05	$1,113	42%	$1,585	$5,002
1.2.4	30 Hz Harmonic	$1,019	40%	$1,426	$1,675
1.2.5	Gamma-t System	$0	0%	$0	$163
1.2.7	Drift Tube Cooling	$3	40%	$4	$12
1.2.11	Booster Dump Relocation	$120	42%	$169	$276
1.2.12	Booster Chopper	$62	40%	$86	$106
1.2.13	Booster RF Modifications	$0	0%	$0	$0
1.3	**Main Injector Upgrades**	**$12,125**	**33%**	**$16,099**	**$19,270**
1.3.1	Large Aperture Quads	$285	24%	$353	$1,363
1.3.2	Main Injector Collimation System AIP Candidate FY06	$628	60%	$1,005	$1,609
1.3.3	NuMI Multibatch Operation	$302	47%	$444	$763
1.3.4	Main Injector RF Upgrade AIP Candidate FY06, FY07	$10,910	31%	$14,297	$15,535
1.4	**Management**	**$16**	**30%**	**$20**	**$1,422**
1.5	**Proton Plan Phase I Study**	**$0**	**0%**	**$0**	**$37**

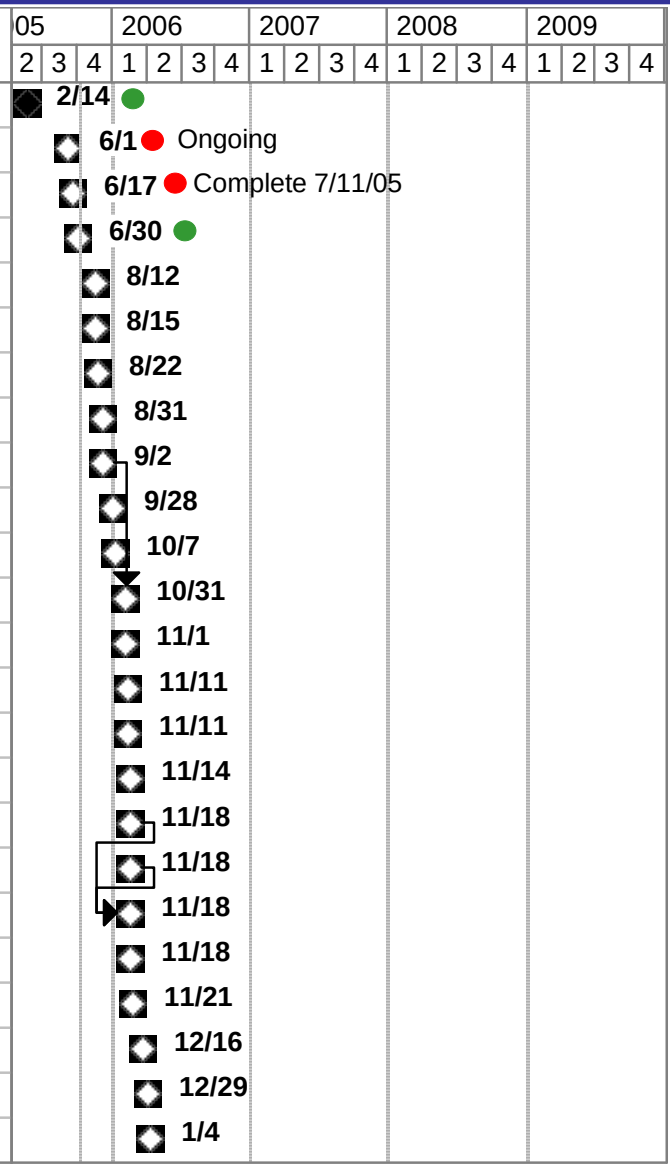
+ G&A > $6million

* Orbump Magnet costs are collected in Run II

E. Prebys/J. Sims

Milestones through Jan. 06

WBS	Name
1.1.1.1.2	Linac Task Force Phase 1 Report Issued
1.5.2	Submit Preliminary Proton Study Group Report
1.3.1.1.3	LAQ Design Complete
1.1.1.1.4	Linac Task Force Phase 2 Report Issued
1.3.1.3.4	LAQ P.S. Ready for Installation
1.3.4.1.1.4	Review MI RF Upgrade Prototype Test (Internal)
1.2.2.1.2.6	OrBump Magnets Ready for Install on Girder
1.1.2.1.6	Linac Quad Power Supplies Design & Dwgs Complete
1.2.2.1.3.4	OrBump Stripline Assy Complete
1.2.2.1.4.5	OrBump Girder Assy Complete
1.3.1.1.6.4	LAQ Ready for Installation
1.4.4	Start 2005 Shutdown
1.5.3	Submit Final Proton Study Group Report
1.2.7.1.3	Flex Tube Installation Complete
1.3.3.1.3.1.4	Barrier Bucket Cavity Installation Complete
1.2.11.6.14	Booster Dump Relocation Installation Complete
1.3.1.2.3	LAQ Align/Install Complete
1.3.1.3.6	LAQ P.S. Installation Complete
1.3.1.3.7	LAQs System Installed
1.3.2.2.4	MI-8 Collimators Installation Complete
1.2.2.2.12	OrBump Power Supply Ready for Installation
1.2.2.3.2.6	OrBump System Installation Complete
1.2.5.1.2	Gamma-t Studies Complete
1.2.4.1.4	30 Hz Harmonic Project Decision



Technical Reviews

WBS	Name	Start	Comments
1.3.2.1.2.2	Review Concept for MI-8 Collimation System	6/7/05	Occurred 6/7/05
1.2.2.2.4	OrBump P.S. Design Review	6/15/05	Occurred 6/15/05
1.2.11.2	Review Booster Dump Relocation Design	7/5/05	Ongoing
1.3.4.1.1.4	Review MI RF Upgrade Prototype Test (Internal)	8/16/05	
1.3.2.1.3.2	Review Concept for MI Collimation System	11/30/05	
1.2.4.1.3	Review 30 Hz Harmonic Prototype/Project Decision	1/4/06	
1.2.3.3.3	Review Corrector System	1/5/06	
1.2.12.2	Review Booster Chopper	6/29/06	
1.3.4.1.1.7	Review MI RF Upgrade Plan	7/7/06	
1.3.4.1.1.8	Review in-Beam MI RF Upgrade Prototype Cavity Test (Internal/External)	7/7/06	

All technical reviews are documented on our website:

http://www-accel-proj.fnal.gov/internal/Proton_Plan/index.html

Progress as of June 30, '05

WBS	Name	Planned %	Actual %	A/P %	
1	Proton Plan	6.3%	4.7%	75%	
1.1	Linac Upgrades	7.3%	5.4%	74%	*
1.2	Booster Upgrades	6.9%	3.6%	52%	*
1.3	Main Injector Upgrades	5.4%	4.4%	81%	*
1.4	Project Management	9.0%	9.0%	100%	
1.5	Proton Study Group	16.7%	16.7%	100%	

* June status of these subprojects was not complete as of 7/7/05

Effort for May/June '05

WBS	WBS Name	Actual FTE	Plan FTE	
1	Proton Plan	38.0	54.2	
1.1	Linac Upgrades	2.3	3.5	
1.2	Booster Upgrades	9.1	16.9	*
1.3	Main Injector Upgrades	23.2	29.6	*
1.4	Project Management	3.4	4	
1.5	Proton Study Group	0.0	0.2	

* Not all personnel have not been reporting to the proper tasks. This will be corrected in July.

M&S Spending- Direct, No Contingency

M&S Spending by Obligation In $K		Planned					Inception To date Costs			%Used
		Estimate								ITD Obl+RIP
		FY05	FY06	FY07	FY08	Total	Actual	Obl.	Obl+RIP	/Total Est
1	Proton Plan	2,699	2,608	10,944	30	16,280	360	1,940	1,989	12%
1.1	**Linac Upgrades**	**1,495**	**191**	**2**	**0**	**1,688**	**2**	**1,465**	**1,465**	**87%**
1.1.1	Linac PA Vulnerability	1,495	3	0	0	1,498	0	1,463	1,463	98%
1.1.2	Linac Quad Power Supply	0	188	2	0	190	2	2	2	1%
1.1.3	LLRF	0	0	0	0	0	0	0	0	0%
1.2	**Booster Upgrades**	**430**	**1,819**	**203**	**0**	**2,452**	**117**	**152**	**195**	**8%**
1.2.1	Determine Rep Rate Limit	0	0	0	0	0	0	0	0	0%
1.2.2	Orbump System	119	17	0	0	136	98	116	116	85%
1.2.3	Corrector System	213	697	203	0	1,113	15	15	39	3%
1.2.4	30 Hz Harmonic	36	983	0	0	1,019	1	11	11	1%
1.2.5	Gamma T System	0	0	0	0	0	0	0	0	0%
1.2.7	Drift Tube Cooling	0	3	0	0	3	0	0	0	0%
1.2.11	Booster Dump Relocation	63	57	0	0	120	3	11	30	25%
1.2.12	Booster Chopper	0	62	0	0	62	0	0	0	0%
1.2.13	Booster RF Modifications	0	0	0	0	0	0	0	0	0%
1.3	**Main Injector Upgrades**	**771**	**594**	**10,734**	**25**	**12,125**	**242**	**323**	**329**	**3%**
1.3.1	Large Aperature Quads	269	16	0	0	285	241	254	259	91%
1.3.2	MI Collimation System	204	424	0	0	628	0	4	4	1%
1.3.3	NuMI Multibatch Operation	148	154	0	0	302	0	64	64	21%
1.3.4	MI RF Upgrade	150	0	10,734	25	10,910	1	1	1	0%
1.4	**Management**	**3**	**4**	**4**	**4**	**16**	**0**	**0**	**0**	**0%**
1.5	**Proton Study Group**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0%**

$ Reporting/Schedule Status

- Cost reporting is currently performed monthly using Oracle reports manipulated in Excel. The focus is solely on obligations - no earned value reporting, thus far.

- Cost Reporting will transition to COBRA sometime after the project baseline.
  - Earned Value and Obligation Reporting… more automated
  - May take a little time to get up to speed with Ann's move to AD budget office.

- Schedule statusing from level 2 and level 3 managers is in place – Ken Domann solicits input monthly from the appropriate team members.

Summary

- The Proton Plan management tools are currently in place and functioning (Resource loaded schedule, cost and effort reporting, schedule statusing, cost accounting, technical reviews, team meetings).
- Change Control procedures are being developed and will be in effect as of the baseline date.
- We will focus on refining the Booster Correctors (AIP) and MI RF sections to be prepared for the upcoming reviews.
- The Proton Plan Design handbook is being drafted by the project team to provide a basis for technical scope and criteria.
- The Proton Plan team is meeting weekly to refine the plan and prepare for the baseline.
- AD Review of Baseline - July 21 and 22, 2005.
- Director's Review of Baseline - August 23 through 25, 2005.